I PU ELECTRONICS (40)
MID –TERM EXAMINATION 2023-24

Time: 3Hours **Max Marks: 70**

PART-A

I Select the correct answer from the choices given **15x1 =15**

1. What is the SI unit of power?
a. Ampere b. Volt c. Coulomb d. Watt

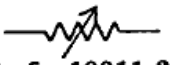
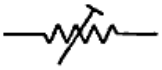
2. Charge on a single electron is
a. 1.60218×10^{-19}C b. 1.60218×10^{19}C c. 6.25×10^{18}C d. 6.25×10^{-18}C

3. How do you arrange cells to get desired current rating?
a. series b. parallel c. series or parallel d. none of the above

4. Mention the type of battery used in mobile phones.
a. alkaline battery b. Lithium -ion battery c. Zinc cadmium battery d. all of the above

5. What will be the current flowing through an open circuit?
a. zero b. minimum c. maximum d. infinite

6. Write the symbol of fixed resistor

a.  **b.**  **c.**  **d.** 

7. Write the 2's complement of a 10011_2?
a. 01001 b. 01100 c. 01101 d. 10100

8. Write the logic expression for the output of NAND gate.
a. $Y = \overline{A + B}$ b. $Y = \overline{AB}$ c. $Y = \bar{A}B + A\bar{B}$ d. $Y = \bar{A}\,\bar{B} + AB$

9. What is a byte?
a. Group of 4 bits b. Group of 8 bits c. Group of 2 bits d. Group 16 bits

10. Mention the universal gate
a. AND gate b. OR gate c. NOR gate d. NOT gate

11. Name the output wave form generated by the Astable multivibrator.
a. Square wave b. sine wave c. sawtooth wave d. triangular wave

12. Which is the purest form of semiconductor?
a. Intrinsic semiconductor b. Extrinsic semiconductor
c. n-type semiconductor d. p-type semiconductor

13. What is the effect of forward bias on the width of a p-n junction?
a. increases b. decreases c. constant d. none of the above

14. What is the knee voltage of silicon?
a. 0.2V b. 0.7V c. 0.6V d. 0.3V

15. What is the status of semiconductor at absolute temperature?
a. insulator b. conductor c. liquid d. semiconductor

II. Fill in the blanks by choosing appropriate answer from those given in the bracket **5 x 1 = 5**
[a. NOT gate b. digital signal c. depletion region d. resistance e. passive components]

16. The property of a conductor that opposes the flow of electric current through it is called_____.
17. The components which are normally absorb, store or dissipate energy, but are unable to supply energy to the network is known as _____.
18. The logic gate whose output is high when the input is low is known as_____.
19. A signal which can have only two distinct values is called_____.
20. The region near the junction where there is no free electrons and holes is called the _____.

PART –B

III Answer any FIVE questions **5 x 2 = 10**

21. Write any two comparison between the direct current and the alternating current
22. What is meant by a non-linear network? Give an example for non-linear device.
23. What is the difference between conventional current and electron current?

24. Convert 286_{10} to Hexa decimal system.
25. Draw the circuit diagram of given Boolean expression $Y = \overline{A\bar{B}} + \overline{\bar{A}B}$
26. Simplify the Boolean expression $Y = \overline{AB} + \overline{AC} + \overline{A}\overline{B}\,C$
27. Write any two properties of semiconductors.
28. What is doping? Name any one donor impurity.
29. Name the majority and minority charge carriers in p-type semiconductor

PART-C

IV Answer any FIVE questions **5 x 3 = 15**

30. Mention any three limitations of Ohm's law.
31. How to convert voltage source into current source? Explain.
32. Define the following terms in an AC signal
    a. Frequency b. Time period c. RMS Value
33. With a diagram explain the role of dielectric in capacitor construction.
34. What is the resistance value of following resistors?
    a. SMD resistor printed with the code **223**
    b. Four colour bands resistor has **Grey Red Black and Gold** colours
    c. Five colour bands resistor has **Green Blue Black brown and red** colours
35. State and prove De-Morgans theorems.
36. With a circuit diagram explain the working of NOT gate. Write its truth table.
37. Explain how n-type semiconductor is formed?
38. Mention any three applications of a diode.

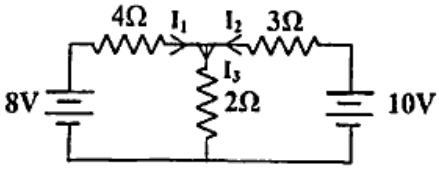
PART-D

V Answer any THREE questions **3 x 5 = 15**

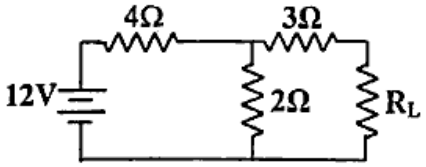
39. Obtain an expression for the equivalent resistance of two resistors are connected in series. Write the symbol and unit of resistance.
40. State and explain super position theorem with an example.
41a. With a diagram explain the constructional features of electrolytic capacitor.
    b. Mention any two specifications of resistor. **3+2**
42. With a circuit diagram explain the working of AND gate. Write its truth table.
43. Draw the circuit diagram of DTL NOR gate. Explain its function with the truth table.
44. With a circuit diagram, describe an experiment to draw the forward and reverse characteristics of a diode.

VI Answer any TWO questions **2 x 5 = 10**

45. Determine the current flowing through the resistor R_L in the circuit given below by using Kirchhoff's laws.



46. Determine the maximum power developed across the resistor R_L in the circuit given below.



47a. How much energy is stored in a 30 μF capacitor with 12 V across its plates?
    b. Two capacitors of capacitances 3 pF and 12 pF are connected in parallel across 30 V dc supply. Determine a) Effective capacitance of the combination b) the charge on each capacitor c) the total charge on the combination. **2+3**
48 a. Subtract $(37)_{10}$ from $(78)_{10}$ using 1's complement method.
    b. CAE_{16} into binary system. **4+1**